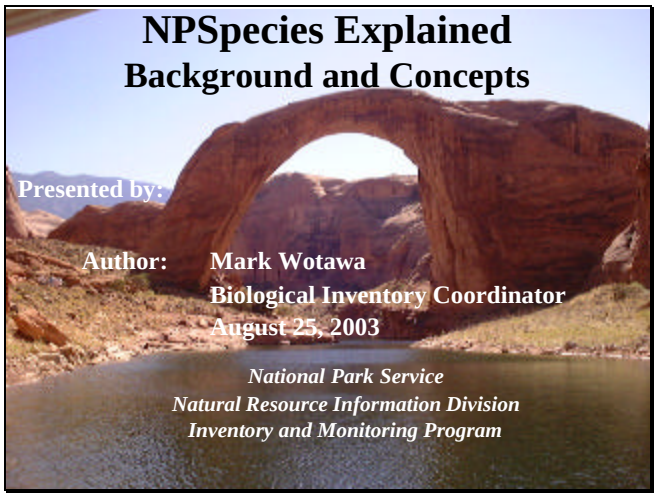

- This presentation is intended for users and managers of NPSpecies data.
- It is one of several documents pertaining to NPSpecies.

Help

- **Biological Inventories**
  - http://science.nature.nps.gov/im/inventory/biology
- **NPSpecies Home Page & Desktop Application**
  - http://science.nature.nps.gov/im/apps/npspp
- **Data Mining to Populate NPSpecies**
  - http://science.nature.nps.gov/im/apps/npspp/datamine
- **NPSpecies Secure Online Application (currently login only)**
  - https://science1.nature.nps.gov/npspecies
- **Contacts**
  - Mark Wotawa 970-225-3567 (Bio. Inv. & NPSpecies)
  - Simon Kingston 970-225-3551 (Desktop application)
  - Chris Emmerich 970-267-2130 (Online application)
  - Alison Loar 970-267-2112 (Data Manager)

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12 Baseline Inventories

- **Documented species lists of vertebrates and vascular plants**
- **Abundance and distribution of high priority species**
- **Natural resource bibliography**
- **Base cartographic data**
- **Geology map**
- **Soils map**
- **Weather data**
- **Air quality**
- **Location of air quality monitoring stations**
- **Water body location and classification**
- **Water quality data**
- **Vegetation map**

INTEGRATE USING STANDARD, MODERN TOOLS

- Twelve baseline (phase I) inventories were identified at the onset of the NPS I&M Program in the early 1990s.
- The Biological Inventories Project include 2 of the 12 inventories.
- The ultimate goal is to integrate the information from the 12 baseline inventories using standard, modern tools.

Biological Inventory Goals

1. Documented checklist of vertebrates and vascular plants for 270 parks
2. Distribution and abundance of priority species (e.g. T&E, Exotics, etc.)
3. Baseline information for long-term monitoring

- The first 2 goals of the Biological Inventories Project match the 2 baseline inventories.
- NPSpecies was designed to address the first goal.
- GIS maps will be developed to address the second goal.
- The 3rd goal supports long-term monitoring, as do the other 10 baseline inventories.

Goal 1 = NPSpecies

1. Document through existing, verifiable data and targeted field investigations the occurrence of at least 90% of the species of vertebrates and vascular plants currently estimated to occur in the parks.

Meeting Goal 1 of the Biological Inventories is dependent on completing NPSpecies.

- NPSpecies is designed to accommodate "existing" data and new data from "targeted field investigations".
- The species lists in NPSpecies are "documented" through References, Vouchers, Observations (and eventually Datasets) which are all "verifiable" to some degree.
- When NPSpecies is populated and properly reviewed and updated according to standard QA procedures, it will be able to provide "estimates" of the "current" vertebrate and vascular plants in each park and to identify which are "documented" with "current" data.
- Meeting Goal 1 of the Biological Inventories is dependent on completing NPSpecies.

Building a Documented Park-Species List

Species	Park-Status	#Refs	#Vou	#Obs
Spp 1	Present	2	0	0
Spp 2	Historic	1	4	0
Spp 3	Unconfirmed	0	0	3
Spp 4	Prob. Present	0	0	0

References	Vouchers Species 2	Observations Species 3
Reference A - Spp 1 Reference B - Spp 1 - Spp 2	Voucher 1 Voucher 2 Voucher 3 Voucher 4	Observation 1 Observation 2 Observation 3

- Many parks built their species lists by entering documentation into NPSpecies.
- They gathered reports and publications (references) that listed species found in past surveys, entered them in NatureBib (the NPS Natural Resource Bibliography), and then linked the species listed in the reference to NPSpecies.
- They gathered voucher records (for specimens, photos, audio recordings, etc.) from various NPS and non-NPS

sources and entered them in, or converted them to NPSpecies.

- They gathered observation records (NPS observation cards, field notes, etc.) from various NPS and non-NPS sources and entered them in, or converted them to NPSpecies.
- As resources became available to conduct new field surveys, they added to their lists by entering reports, vouchers and observations generated from the results of new field surveys.
- Sometimes a species was suspected of being in a park, but there was no documentation. In this case, just the species was added to the list.
- After a quantity of existing documentation were entered, they (or others) then reviewed the entered documentation, and in combination with their current knowledge, assigned the current status of the species in the park.

Checklist Fields

- **Park-Status**
- **Abundance**
- **Residency**
- **Nativity**
- **Cultivation**

·See Data Dictionary for field and value definitions.

·Need to be kept "current".

- In addition to "Park-Status", there are other "Checklist" fields that need to be entered based on a review and interpretation of the documentation.
- The definitions and values for the checklist fields are contained in the NPSpecies Data Dictionary.
- The "Checklist Fields" need to be revisited and updated on a regular basis to reflect current knowledge and documentation of species in parks.

Management Fields

- Weedy Plant
- Pest
- Management Priority
- Exploitation Concern

·See Data Dictionary for field and value definitions

·Need to be kept "current"

- In addition to the Checklist Fields, there are also fields that apply to management in the parks.

Summary

Populate

Review and Update

Certify

Disseminate

- To summarize the building of a documented species checklist:
- Populate the database with documentation, as well as species with no documentation.
- Review and update the data.
- Certify the quality according to standard QA procedures.
- Disseminate appropriate data in the public version of the Master Online NPSpecies.

Updating a Documented Park-Species List

Species	Park-Status	#Refs	#Vou	#Obs
Spp 1	Historic	2	0	0
Spp 2	Present	2	4	0
Spp 3	Present	0	2	3
Spp 4	Present	1	0	3

References
Reference C
·Spp 2
·Spp 4

Vouchers Species 3
Voucher
Voucher

Observations Species 4
Observation
Observation
Observation

- Over time, more existing data will be found and new surveys will generate new data for NPSpecies.
- New and existing references will be entered in NatureBib, linked to species in NPSpecies and the counts in NPSpecies will be automatically updated.
- New or existing vouchers will be entered and the counts in NPSpecies will be automatically updated.
- New or existing observations will be entered and the counts in NPSpecies will be automatically updated.
- At some point in time the species checklist fields will need to be reviewed and updated to reflect current knowledge and documentation.

Summary

Populate, Review and Update, Certify

Populate, Review and Update, Certify

Populate, Review and Update, Certify

Populate, Review and Update, Certify

Populate, Review and Update, Certify

- Populating, reviewing and updating, the certifying NPSpecies should occur repeatedly into the future.

Organisms, Names & Species

- **Organism:** A biological entity identified by a scientific name at the taxonomic rank of species or lower.
- **Scientific Name:** A name for an organism or group of organisms identified by a name at any taxonomic rank.
- **Species:** A group of organisms identified by a scientific name at the taxonomic rank of species.

- Identifying organisms in NPSpecies is important because management occurs at the taxonomic rank below species – for example, some subspecies are listed as federally threatened or endangered.
- Scientific names in NPSpecies are important to efficiently incorporate and manage legacy data.
- The capabilities to present organisms and names rolled up under species is currently being developed in NPSpecies.

Scientific Names

-

Scientific Names

- The list of all scientific names of any taxonomic rank associated with a park regardless of the status in the park or the validity of the name.
- Ranks include Kingdom, Phylum,…,Species, Subspecies,…,Forma.
- Park-status includes present, probably present, unconfirmed, encroaching, historic, false report.

- Scientific Names provide all the past and present names in the park that have been recorded in references, vouchers or observations.
- Names with any park status are included on the Park-Species List because important vouchers and observations exist for species that are not, or may not, currently be in the park.
- Names of higher level taxa (e.g. genus, families, etc.) are included on the Park-Species Lists because important vouchers and observations exist that are only identified to this level.

Certified Organism Lists

-

Certified Organism Lists

- Organisms
  - Local List Checked and Rank of Species or Lower (e.g. subspecies, variety, forma)
  - Park-Status = Present or Probably Present
- Native
  - Organisms with Nativity = Native
- Non-Native
  - Organisms with Nativity = Non-native
- Cultivated
  - Organisms with Nativity = Non-native & Cultivation=Cultivated
- Match Federal T&E
  - Organisms with Federal Status = Threatened or Endangered

- Because of the complicated issues of merging new and legacy information with dynamic, interpreted classification systems, the simplicity of generating high-priority species lists gets lost.
- Certified Organism Lists are shortcuts designed to quickly generate high-priority lists of organisms that are present or probably present in the park without having to learn the intricacies of NPSpecies.
- The Certified Organism Lists are generated based on various values in the NPSpecies database.

Evidence

-

Observations

- **A record in which event (date/time, observer, etc.) and location information of an organism occurrence is permanently catalogued, but no physical evidence of the organism is collected.**

-

Vouchers

- **An observation record in which physical evidence of the organism (specimen, audio recording, photograph, etc.) is also collected, cataloged and archived along with the permanent cataloging of event and location information.**

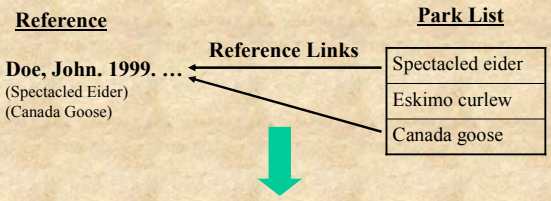
- Note that audio recordings and photographs are “vouchers” for the purpose of documenting species occurrence.
- The curatorial community commonly catalogs specimens separately from audio recordings and photographs – the latter 2 are commonly referred to as “archival” material.

References

- Traditional documents such as publications and reports that document the occurrence and/or status of organisms in parks.
- Cataloged in NatureBib
- NPSpecies records linked to NatureBib references
- Primary References Preferred
  - Example: Doe, John. 1999. Small Mammal Inventory of Katmai NP.
- Secondary References
  - Example: Birds of North America Field Guide

- References are cataloged in the Natural Resource Bibliography, NatureBib.
- Species documented in references are "linked" to the species on a park's species lists in NPSpecies.
- Primary references directly reflect actual observations or vouchers supporting the status of a species in a park.
- Secondary references summarize existing knowledge without directly reflecting the actual supporting vouchers or observations; field guides and county-based floras for example.

Reference Links



Name	# References
Spectacled eider	1
Eskimo curlew	0
Canada goose	1

- Names in NPSpecies are "linked" to names in a reference that has been entered in NatureBib to produce the counts of references in NPSpecies.
- Note that the result of linking only provides the existence of references for each name, and no other information.
- Vouchers or observations that are documented in references should be entered separately in NPSpecies if one wishes to documents event and location information.

Certification

-

Certification

- A record that documents that the QA for an organism list of a park has occurred according to standard QA protocols.

- The Certification record(s) should be distributed with any species list for a park to communicate the QA.

Data Matching

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Data Matching

Scientific Names For a Park

Species	TSN
Spectacled eider	175161
Canada goose	174999

Match

Federal T&E List

Species	TSN	Status
Spectacled eider	175161	T
Eskimo curlew	176605	E

Match to Federal T&E

Species	TSN	Status
Spectacled eider	175161	T

- Match to Master Data refers to the matching of Scientific Names for a park to records in a non-editable list in NPSpecies, to produce a third list of the matched records.
- For example, say there are 2 species on the Park's bird list.
- NPSpecies contains a Master Federal T&E Status list.
- In this example, one species is in both lists.
- When NPSpecies matches the 2 lists, a third list will be presented with the matched records.
- The match to master data functionality was developed so each park didn't have to individually maintain the completeness and accuracy of information provided by the Master lists.

- Because the matched list is dependent on the currency, completeness and accuracy of both the Park-Species List and the Master List, users should use discretion and caution in their interpretation and use.

Match Data Sets

- **Federal Status**
- **State Status**
- **TNC Global Rank**
- **Ozone-Sensitive Species (in development)**

- There are currently several "match" data sets in NPSpecies that use the "Data Matching" functionality.
- Others are being developed.

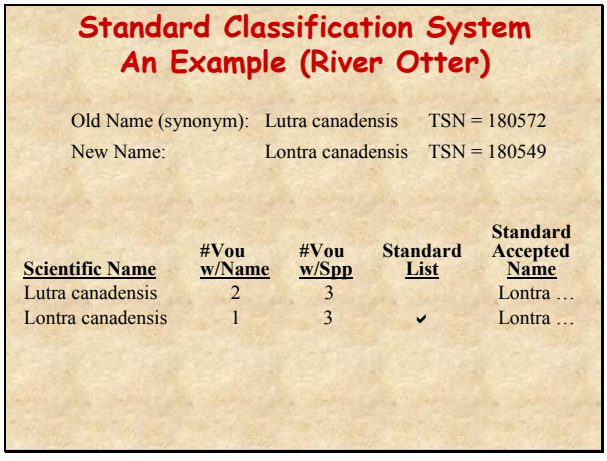
Standard Classification System Types of Names and TSNs

- **TSN (Taxonomic Serial Number)**
  - Unique number for every scientific name of each rank (kingdom,…, genus, species, subspecies, …, forma)
- **ITIS-Managed Names**
  - Permanent
  - Positive TSNs
- **NPS-Managed Names**
  - Semi-permanent
  - -500,000 to -900,000 TSNs
- **Temporary Names**
  - Temporary
  - Negative numbers excluding -500,000 to -900,000

- The Standard Classification System in NPSpecies is the default system for taxonomy and nomenclature.
- The Standard Classification System is based on a unique number (integer) called the Taxonomic Serial Number (TSN) that is assigned for each name of each taxonomic rank (kingdom, …, genus, species, subspecies, …, forma).
- The core of the classification system is the names managed by ITIS (Integrated Taxonomic Information System), a cooperative inter-agency project under the Department of Agriculture.
- There are 3 types of names and associated TSNs in NPSpecies.
- Users should be familiar with the 3 types of names, identified by 3 ranges of TSNs, because the level of functionality that can be provided in NPSpecies regarding names is dependent on the type of name.
- The ITIS names in the Standard Classification System are a permanent part of the Standard Classification System and are identified by positive

TSNs.

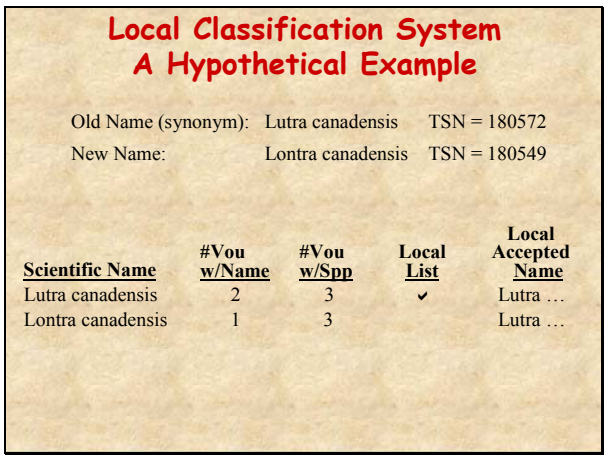
- Because ITIS is incomplete (i.e. there are many names in use that are not in ITIS), the NPS I&M Office developed, manages and distributes an additional list of names in the Standard Classification System, called Semi-Permanent names.
- Semi-Permanent names are identified in the Standard Classification System with TSNs between –500,000 and –900,000.
- Temporary Names are names in the classification system that a user enters when they cannot find the name in the distributed list of permanent and semi-permanent names.
- When the user enters a temporary name, NPSpecies automatically assigns the name a TSN that is a negative number outside the range of –500,000 to –900,000
- The National I&M office is continuously converting temporary and semi-permanent names to permanent names as they become available in ITIS, with the goal of eliminating all names with negative TSNs in the future.
- The section on Quirks will discuss some of the inconsistencies in NPSpecies due to the 3 types of names.



- The functionality of the Standard Classification System in NPSpecies is best demonstrated by an example.
- The river otter, which recently changed names due to a change in genus will be used in the example.
- Say a technician was hired to go to a museum and enter the specimens for a park into NPSpecies.
- They found and entered 2 old specimen vouchers that were recorded as *Lutra canadensis*. (The technician did not

know the name had changed.)

- The following year a new mammal survey was conducted and a voucher was collected and entered by the investigator into NPSpecies as *Lontra canadensis*. (The investigator knew the new name.)
- NPSpecies now has both names for river otter on the Park's Species List because vouchers were entered under both names.
- However, when a species list is distributed, only one name should show up on the list to match the one organism (river otter).
- Additionally, the evidence needs to show up under a single organism rather than under multiple names.
- The Standard List column indicates the accepted name used for the organism and the name that the evidence will show up under.
- The Standard Accepted Name column specifies the accepted name for the multiple names.
- In this example, the new name, *Lontra canadensis*, is the Standard Accepted Name for both *Lutra canadensis* and *Lontra canadensis*.
- With the Standard Accepted Name assigned, the 2 vouchers with the name *Lutra canadensis* and the 1 voucher with the name *Lontra canadensis* will show up as 3 vouchers for the Standard Accepted Name for the river otter, *Lontra canadensis*.
- Note that the Standard List and Standard Accepted Name are determined automatically by the Standard Classification System, and in particular ITIS.



- Now the (hypothetical) river otter example will be used to demonstrate the Local Classification System.
- From the previous example, NPSpecies now has both names for river otter on the Park's Species List because vouchers were entered under both names.
- In this hypothetical example, in contrast to the previous Standard Classification System example, this park (hypothetically) believes the Local Accepted name for the river otter should be the old name, *Lutra canadensis*.
- The Local List column lets the user indicate the local accepted name used for the organism and the name that the evidence will show up under.
- By definition then, the Local Accepted Name for *Lutra canadensis* is *Lutra canadensis*.
- The user can then enter *Lutra canadensis* as the Local Accepted Name for *Lontra canadensis*.
- With the Local Accepted Name assigned, the 2 vouchers with the name *Lutra canadensis* and the 1 voucher with the name *Lontra canadensis* will show up as 3 vouchers for the Local Accepted Name for the river otter, *Lutra canadensis*.
- Note that the Local List and Local Accepted Name are assigned by the user to build the Local Classification System. This differs from the previous example where the Standard Classification System automatically assigned the Standard List and Standard Accepted Name.

Toggling Between Classification Systems

STANDARD

Scientific Name	#Vou w/Name	#Vou w/Spp	Standard List	Standard Accepted Name
Lutra canadensis	2	3		Lontra …
Lontra canadensis	1	3	✔	Lontra …

LOCAL

Scientific Name	#Vou w/Name	#Vou w/Spp	Local List	Local Accepted Name
Lutra canadensis	2	3	✔	Lutra …
Lontra canadensis	1	3		Lutra …

- NPSpecies has 2 classification systems.
- A user will be able to toggle between them.
- Using the previous river otter examples, the alternative presentations of the data are displayed.
- Note that Standard List and Standard Accepted Name are associated with the Standard Classification system.
- Note that Local List and Local Accepted Name are associated with the Local Classification system.
- Note that this example is a special case in that the #Vou w/Spp is the same in both classification systems. This may not happen in all cases depending on how a user assigns the Local List and Local Accepted Name.

Summary

- 2 Classification Systems
- Both use same TSNs

1. STANDARD: Relationships determined by ITIS
2. LOCAL: Relationships determined by user

- Instructor comment: Give a demonstration of Avibase. http://www.bsc-oc.org/avibase/avibase.jsp to show differences in classification systems.

Quirks

- Names not in ITIS
- Families and Orders
- Match to Master Data

- There are a few things that are still being improved upon in NPSpecies.
- They have to do with the Standard Classification System.

Names not in ITIS

- These are identified with negative TSNs.
- Because they are not in ITIS, there are no built-in relationships among the names.
- The Standard Classification System may produce unexpected results when trying to tally organisms.

Families and Orders

- Derived in both classification systems from ITIS.
- Names missing from ITIS may show up as "unassigned" family and order.
- Grouping of names by families and orders may produce unexpected results.

Data Matching

- Dependent on currency, completeness and accuracy of Park-Entered Data and Master Data.
- Use discretion and caution in their interpretation and use.

- Instructor comments: examples of "unexpected" results. 1) Same name in database several times. 2) Order and Family may not be correct.
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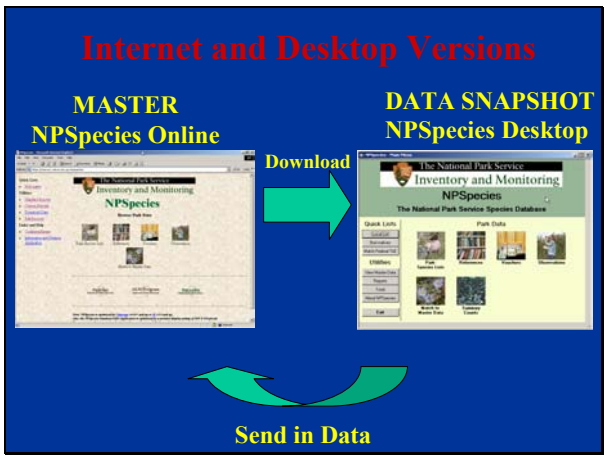
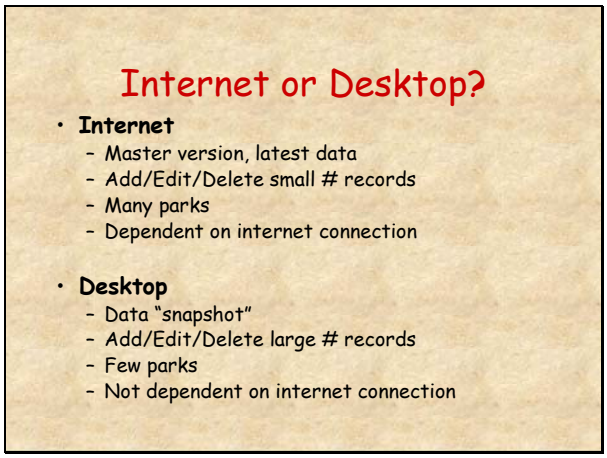


- There are 2 version of NPSpecies: the Master Online version and the Desktop version.
- All data are funneled to the Master Online version.
- At any time, anyone with appropriate access rights can electronically download a "snapshot" of the data from the Master Online version to the Desktop version.
- Because someone could be editing data in the Master Online version, the data in the Desktop "snapshot" may be out of date at any future point in time.
- The uploading of data from the Desktop version is not automated and must occur by sending in data to the National I&M Office.



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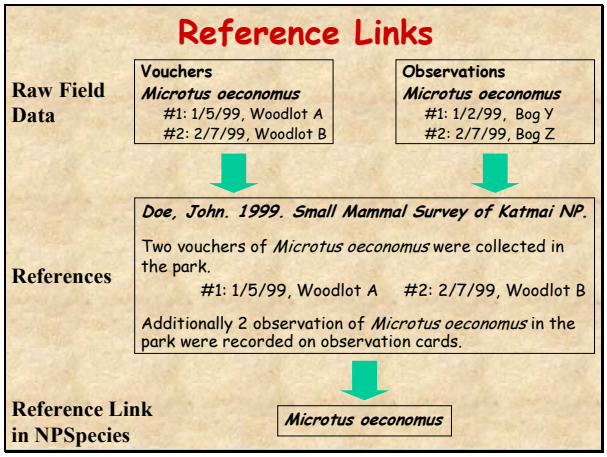

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- Vouchers and observation are the 2 types of raw data that are collected in any field study.
- Vouchers and observations contain event (date) and location data.
- Sometimes, copies of raw field voucher and observation records are recorded in references (or datasets).
- Other times, only summaries of the raw field vouchers and observations are mentioned in references (or datasets) without the event and location data.
- NPSpecies only links the species names in reference (or datasets) to the species lists in NPSpecies.
- Raw voucher and observation records must be entered as vouchers or observations to make event and location information available to NPSpecies.